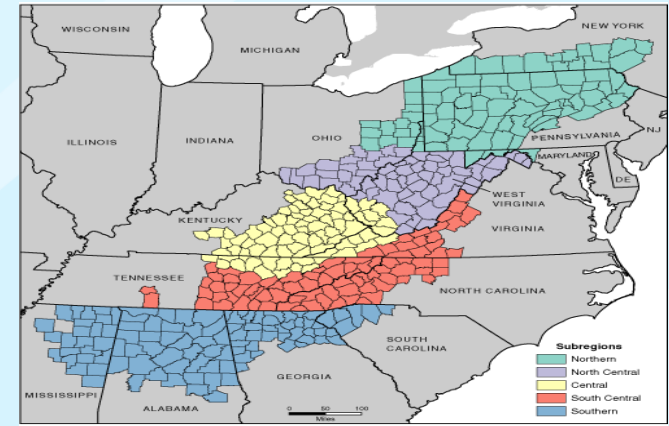


# Updated Cancer Incidence: Appalachia 2004-2011

*November 2014*

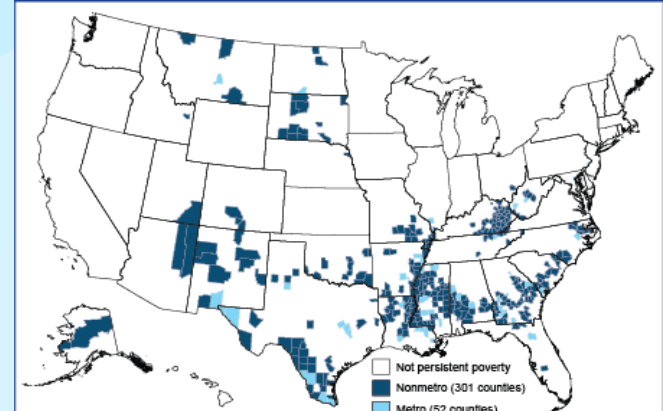
# Background Appalachian Region

- ❑ **Appalachian mountains**
  - *13 states*
  - *420 counties*
- ❑ **Homogeneous characteristics**
  - *Topography*
  - *Demographics*
  - *Economics*



Map by: Appalachian Regional Commission, November 2009.

## Persistent poverty counties



Source: USDA, Economic Research Service. Persistent poverty counties had poverty rates of at least 20 percent in each U.S. Census 1980, 1990, and 2000, and American Community Survey 5-year estimates, 2007-11.

# Background

## Previous Studies

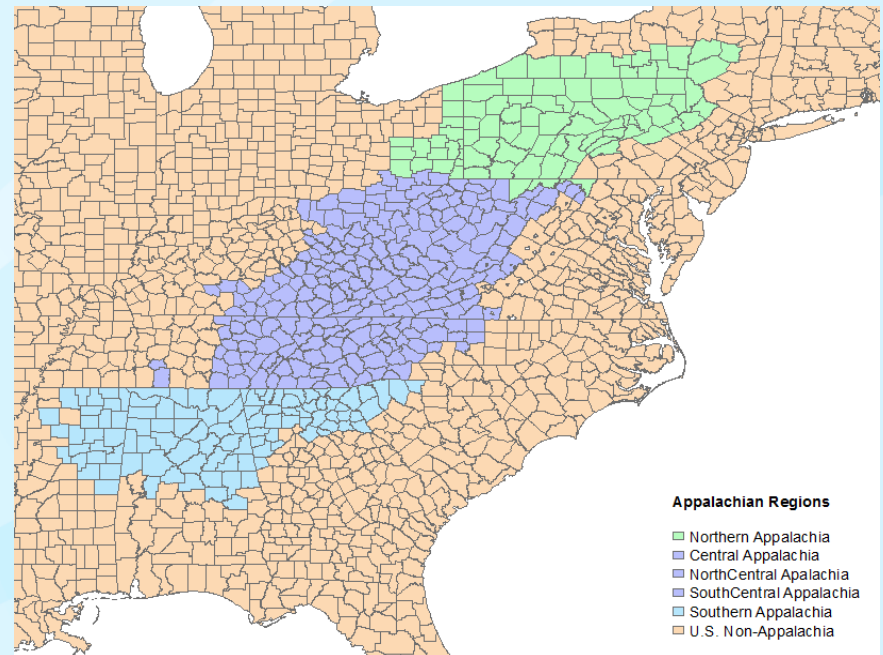
- ❑ **Breast cancer in 3 states**
- ❑ **Cancer survivors in a single university hospital**
- ❑ **Cancer risk perceptions**
- ❑ **Mortality disparities**
- ❑ **Wingo, et al**
  - *11/13 states*
  - *88% population coverage*
  - *2001-2003 with variation by state*

# Purpose

- ❑ **Expand time period**
  - *2004-2011*
- ❑ **Expand population coverage**
  - *100% coverage*
- ❑ **Examine incidence and trends**
  - *State, region, sex, race*
- ❑ **Compare to non-Appalachia**
  - *Within states*
  - *Rest of U.S.*

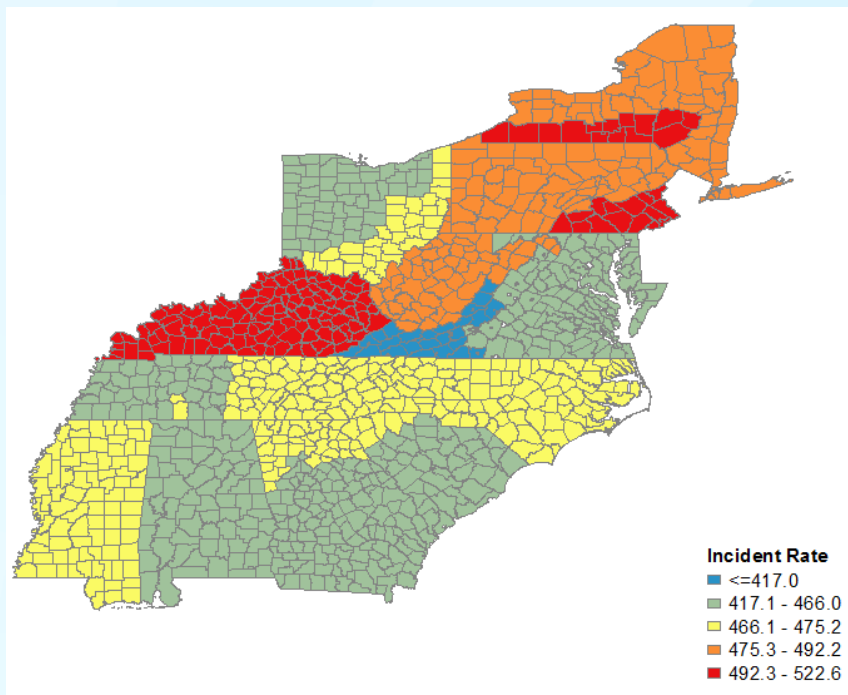
# Methods

- ❑ **Counties identified**
  - *Appalachia vs non-Appalachia*
- ❑ **Appalachian regions identified**
  - *Southern, Central, Northern*
- ❑ **NPCR-CSS 2013 November**
  - *States meeting high quality criteria*
  - *Diagnosis years 2004-2011*

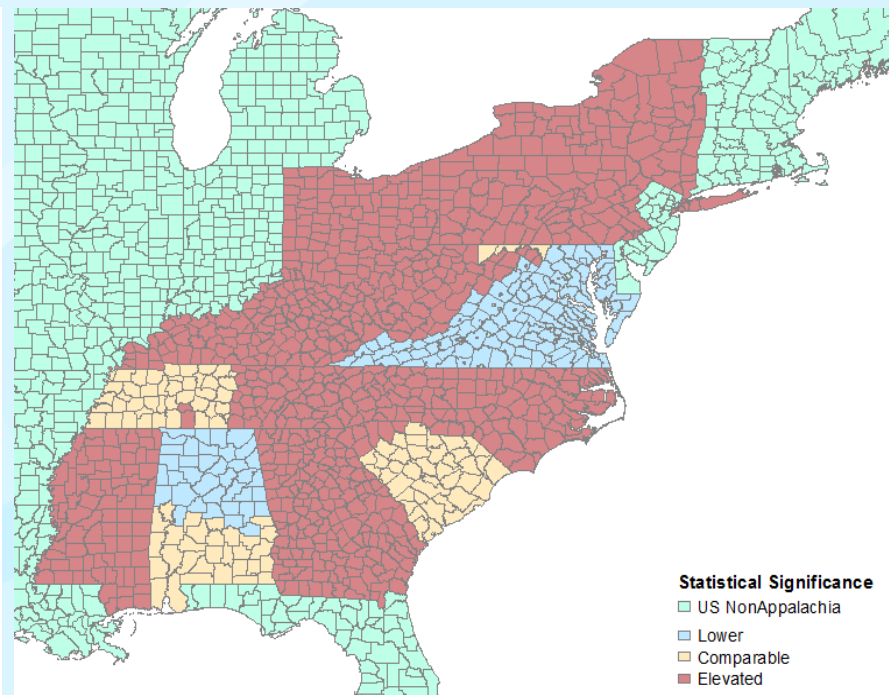


# All Cancer Sites, All Races, Male and Female, Appalachia, 2004-2011

Incidence Rates, Appalachia vs Non-Appalachia

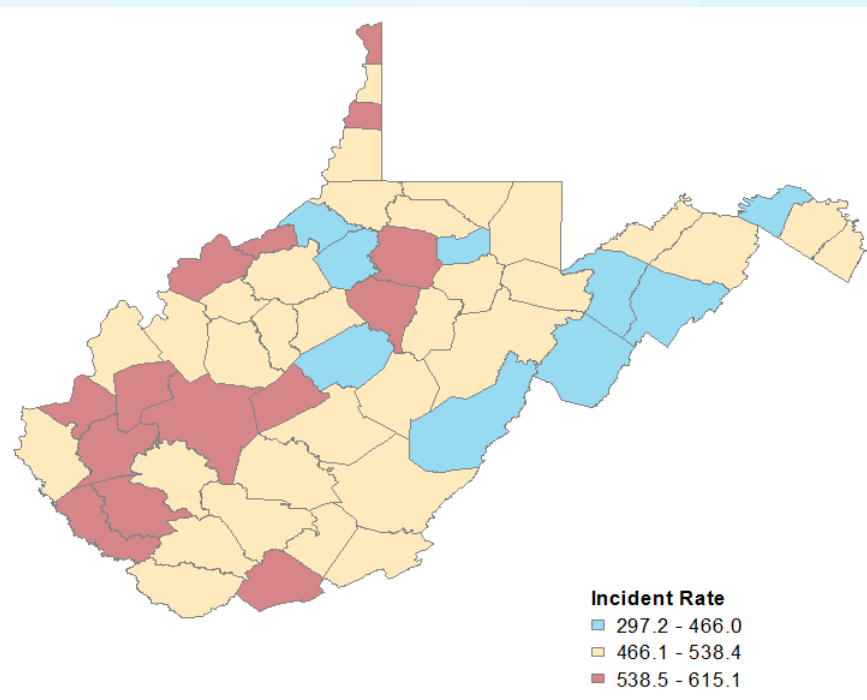


Statistical Significance, Regions vs US Non-Appalachia

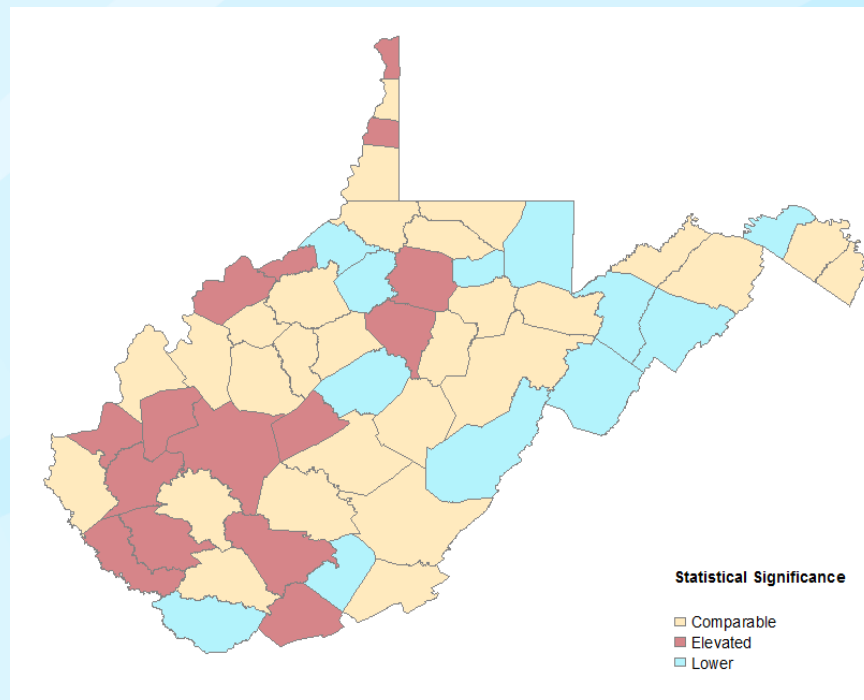


# All Cancer Sites, All Races, Male and Female, by West Virginia County, 2004-2011

Incidence Rates, West Virginia Counties

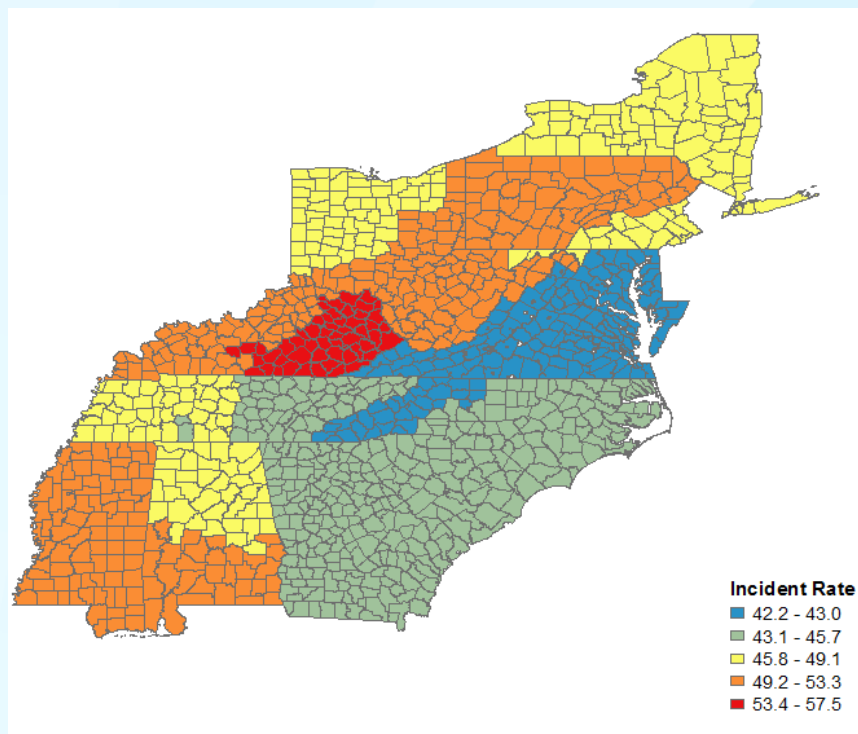


Statistical Significance, Counties vs US Non-Appalachia

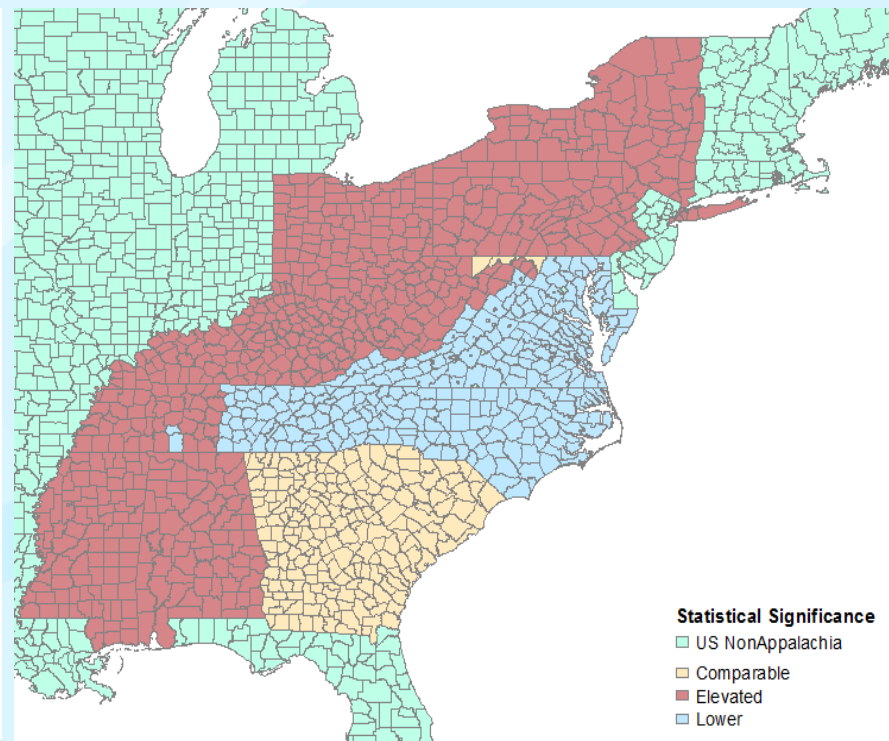


# Colon and Rectum, All Races, Male and Female, Appalachia, 2004-2011

Incidence Rates, Appalachia vs Non-Appalachia



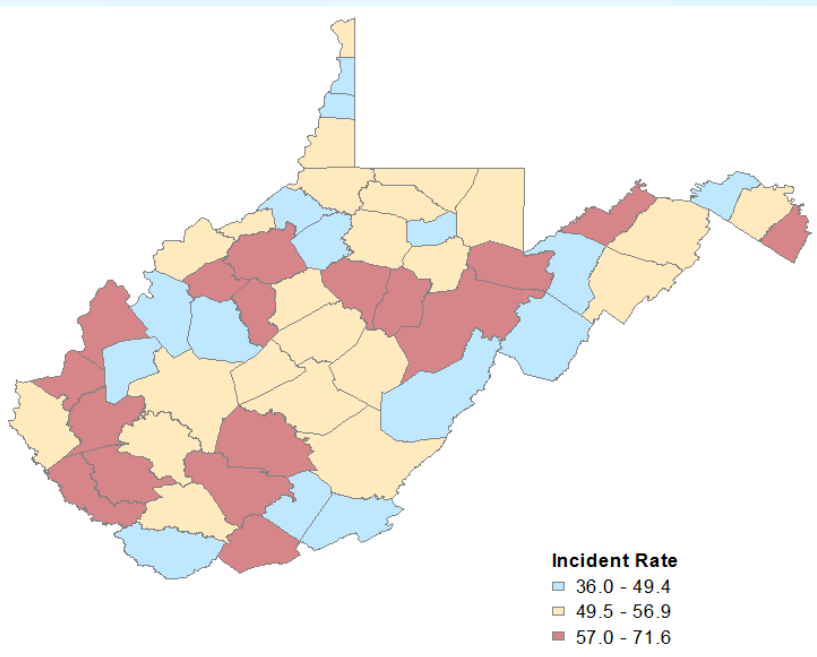
Statistical Significance, Regions vs US Non-Appalachia



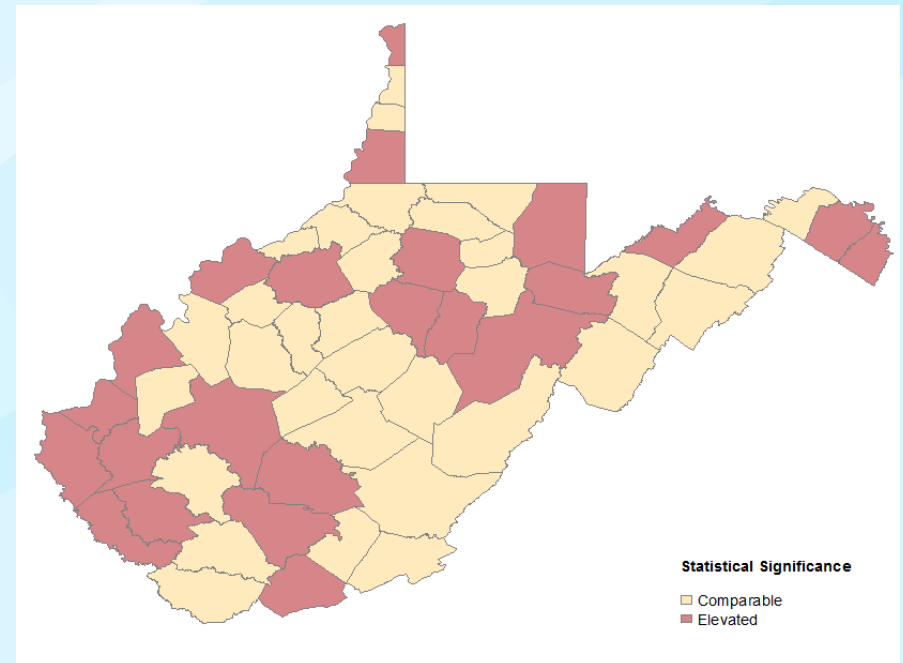


# Colon and Rectum, All Races, Male and Female, by West Virginia County, 2004-2011

Incidence Rates, West Virginia Counties

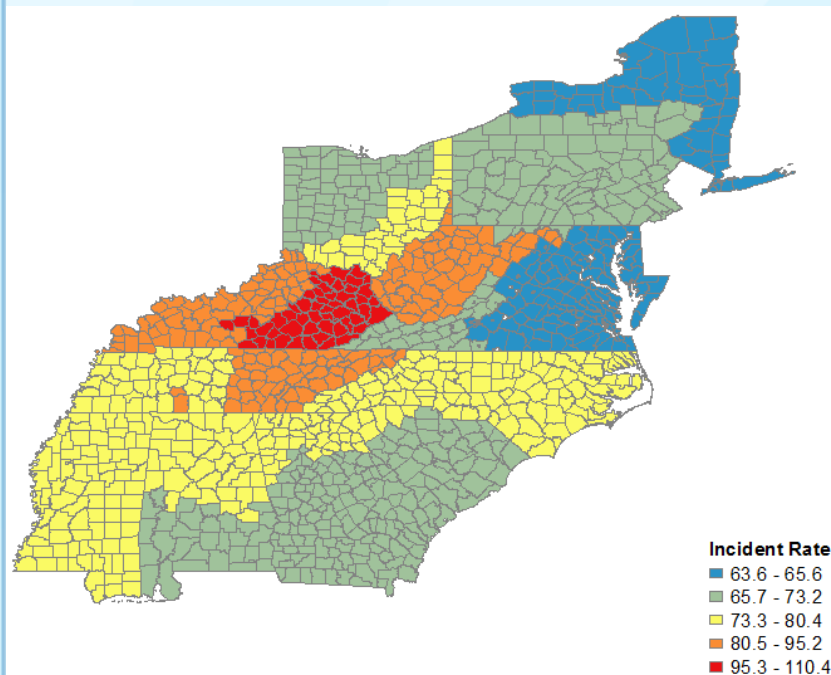


Statistical Significance, Counties vs US Non-Appalachia

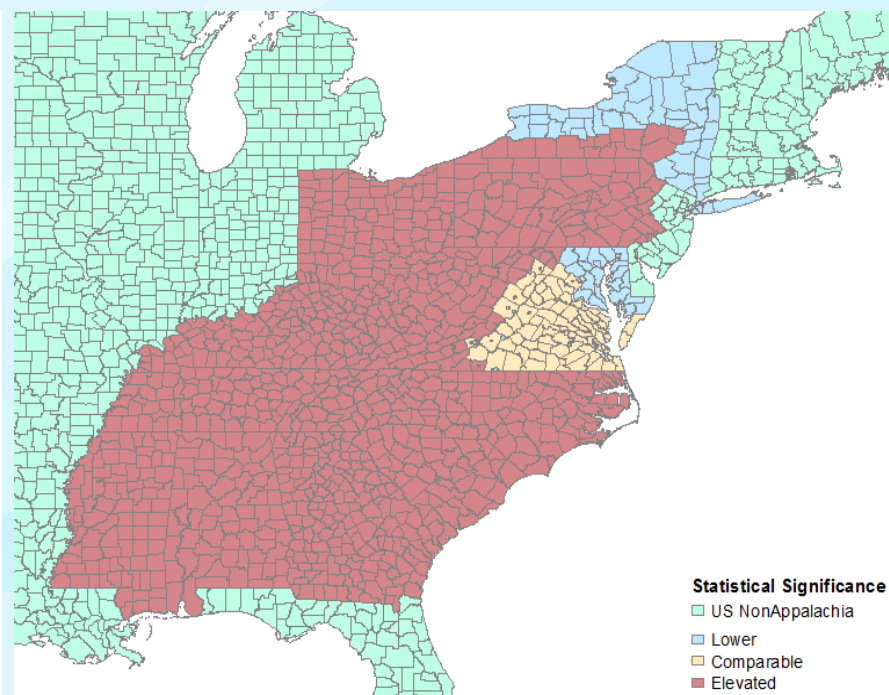


# Lung and Bronchus, All Races, Male and Female, Appalachia, 2004-2011

Incidence Rates, Appalachia vs Non-Appalachia

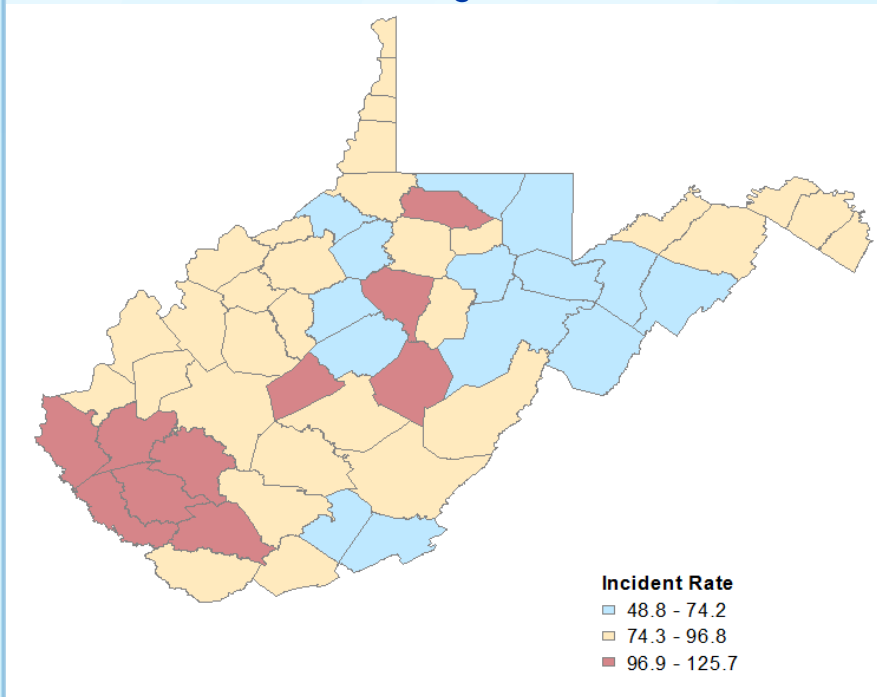


Statistical Significance, Regions vs US Non-Appalachia

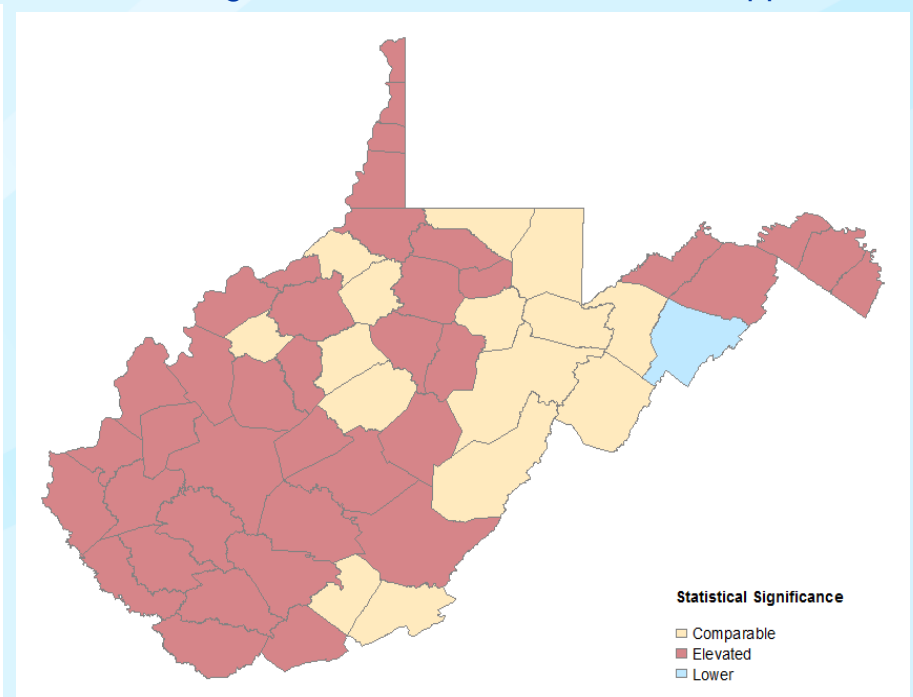


# Lung and Bronchus, All Races, Male and Female, by West Virginia County, 2004-2011

Incidence Rates, West Virginia Counties

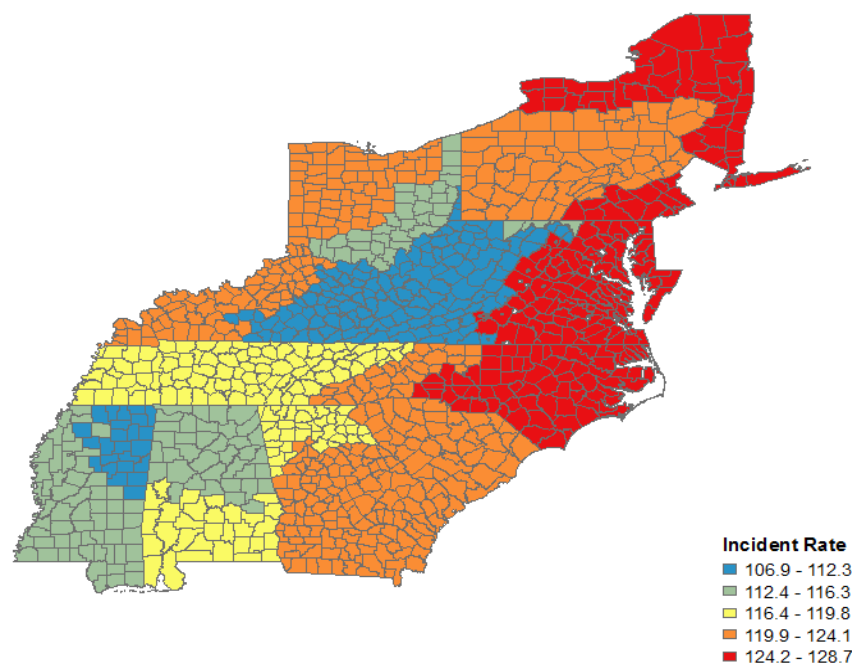


Statistical Significance, Counties vs US Non-Appalachia

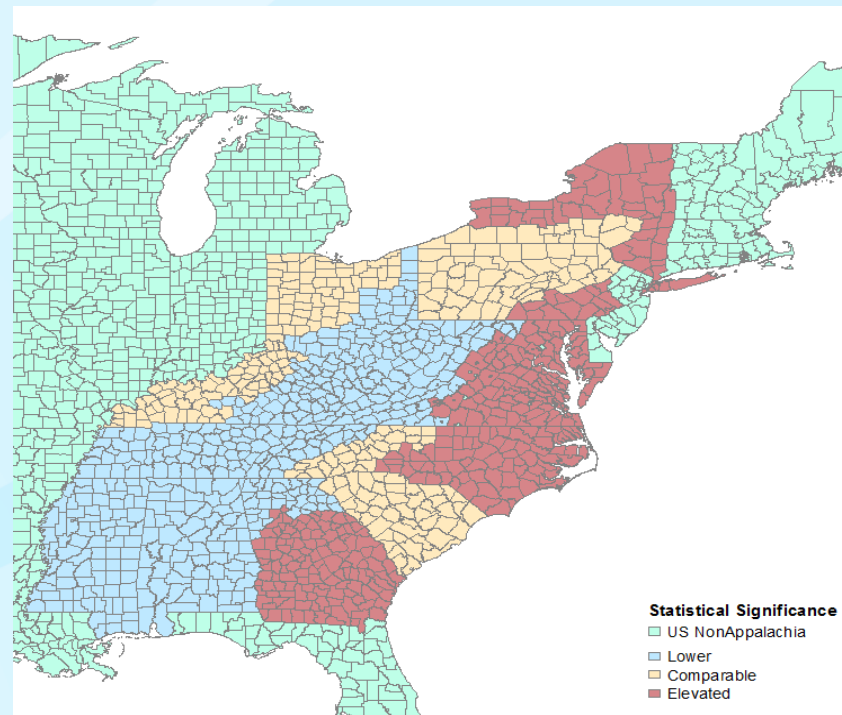


# Female Breast, All Races, Appalachia, 2004-2011

Incidence Rates, Appalachia vs Non-Appalachia

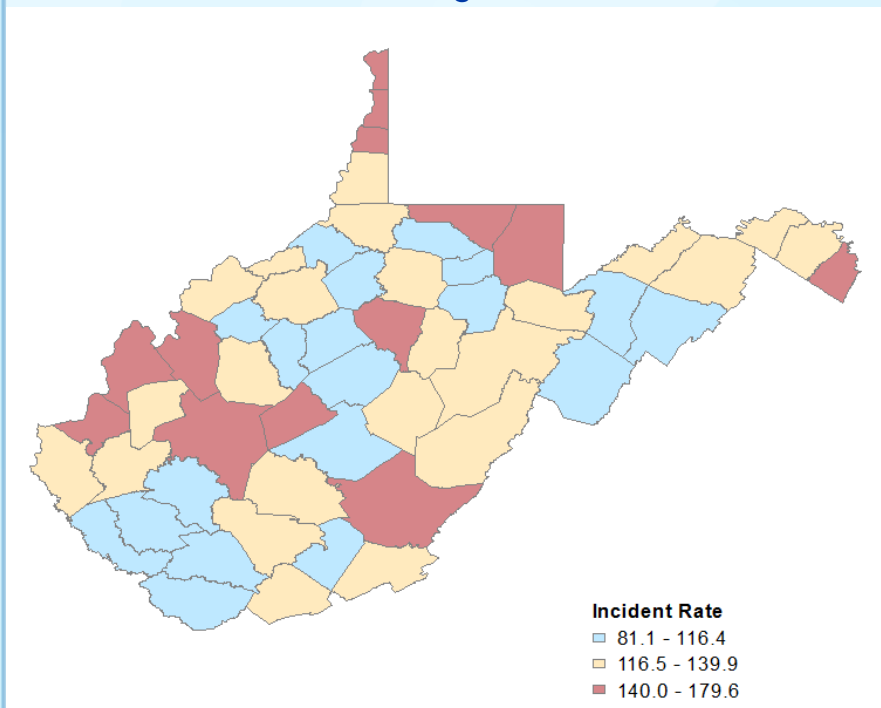


Statistical Significance, Regions vs US Non-Appalachia

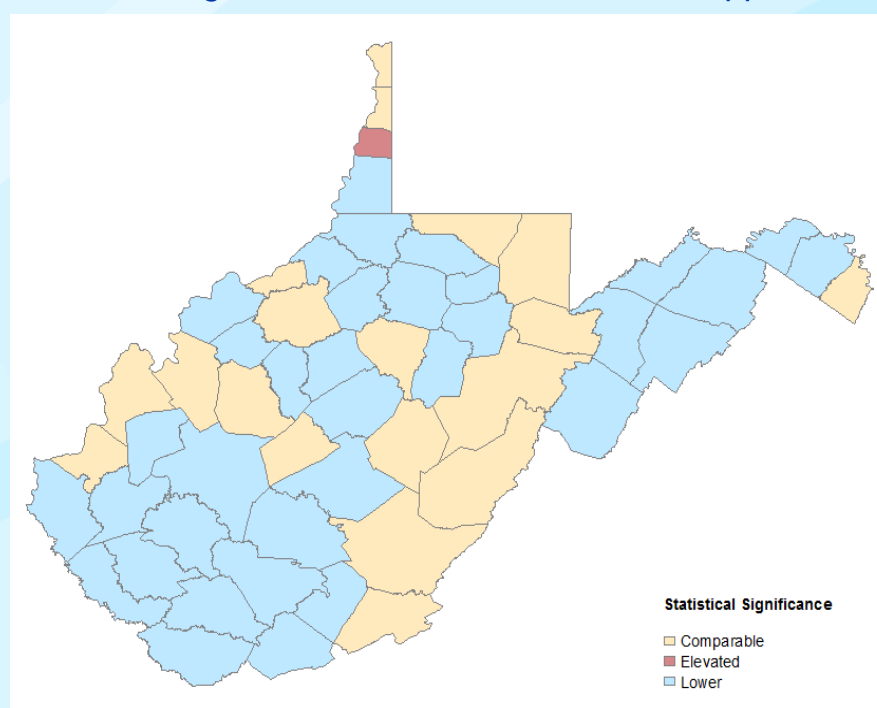


# Female Breast, All Races, by West Virginia County, 2004-2011

Incidence Rates, West Virginia Counties

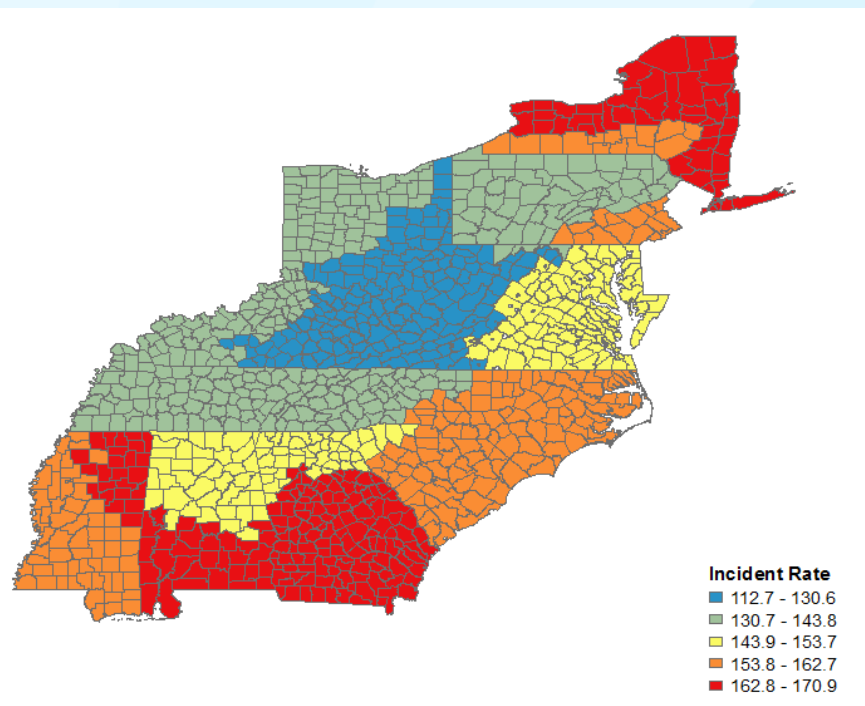


Statistical Significance, Counties vs US Non-Appalachia

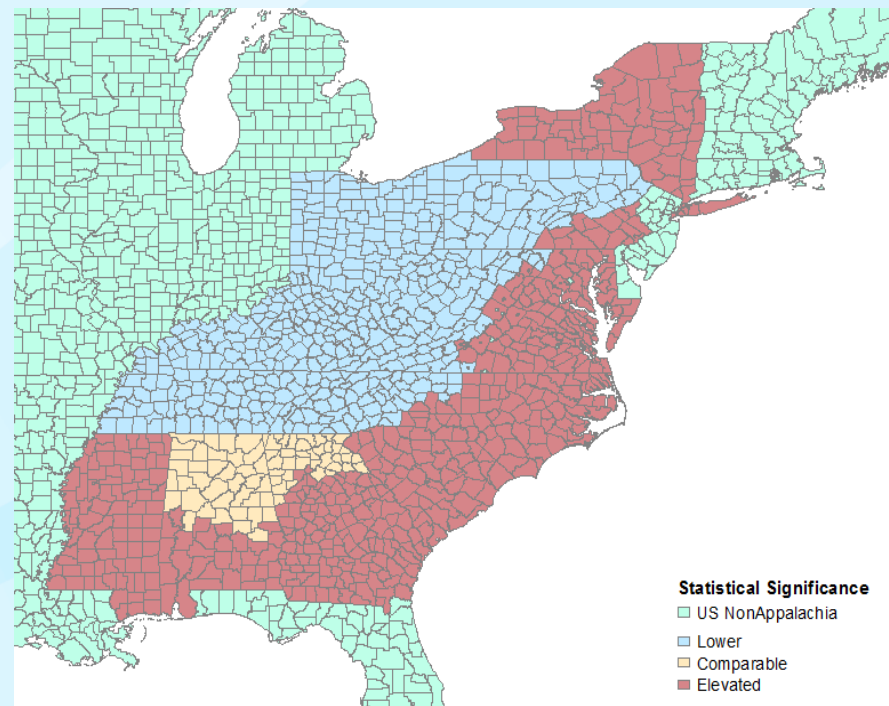


# Prostate, All Races, Appalachia, 2004-2011

Incidence Rates, Appalachia vs Non-Appalachia

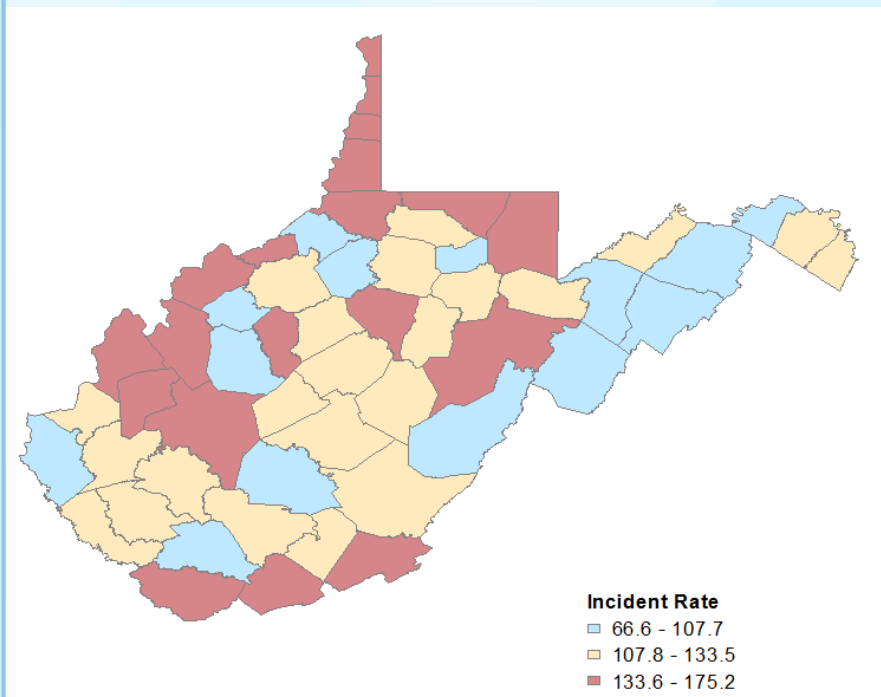


Statistical Significance, Regions vs US Non-Appalachia

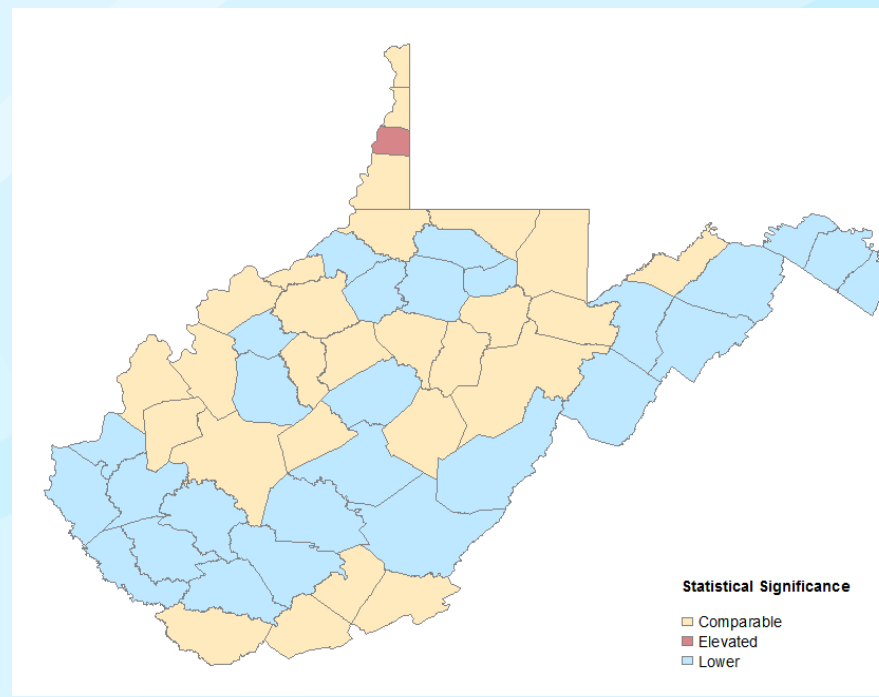


# Prostate, All Races, by West Virginia County, 2004-2011

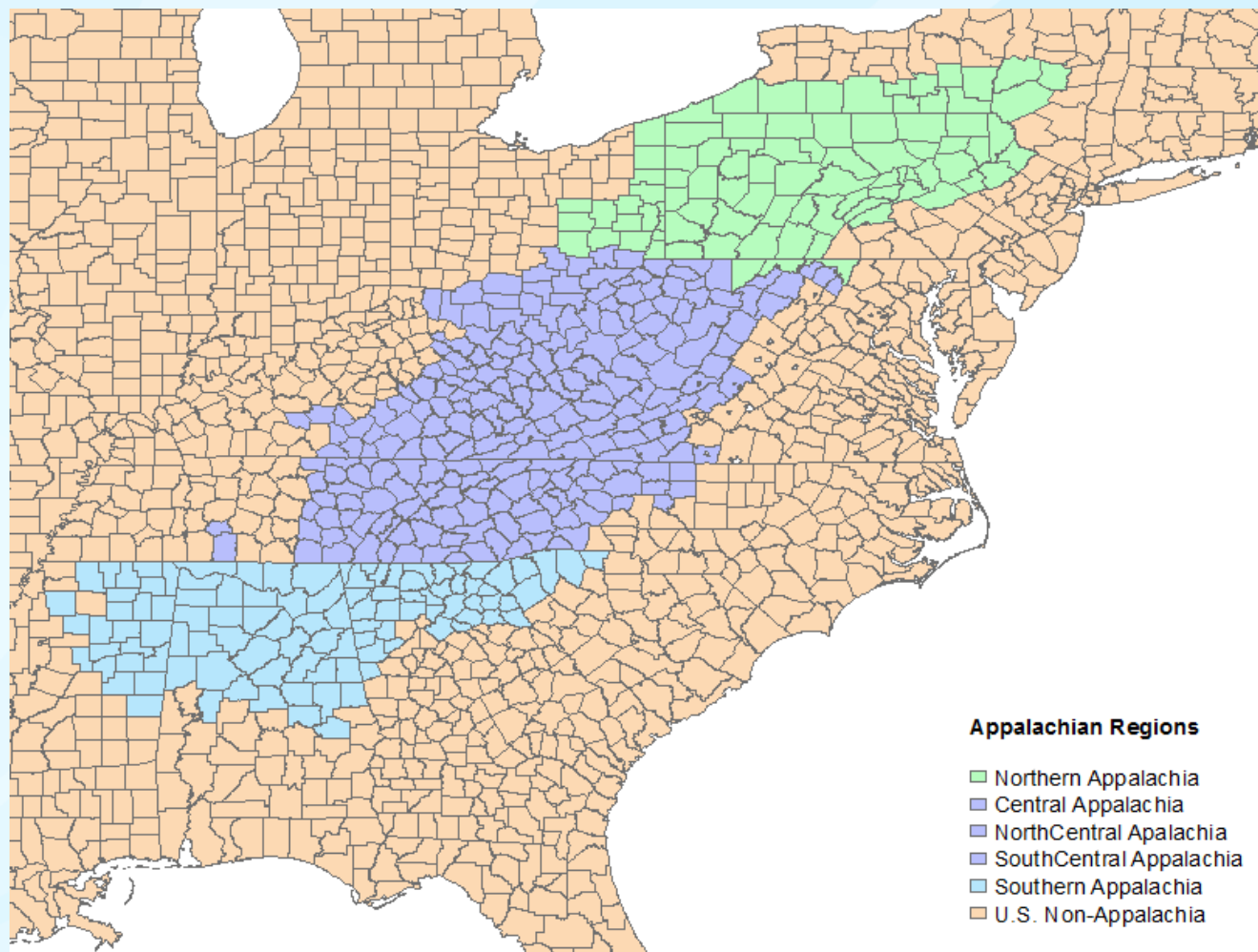
Incidence Rates, West Virginia Counties



Statistical Significance, Counties vs US Non-Appalachia



# Appalachian Regions





# Invasive Cancer Incidence Rates by Primary Site and Appalachian Region and US, Males, All Races, 2004-2011

	Southern Rate	Central Rate	Northern Rate	US Non-Appalachia Rate
<i>All Sites</i>	<b>568.7</b>	<b>561.6</b>	<b>567.1</b>	542.5
<i>Oral Cavity and Pharynx</i>	<b>18.9</b>	<b>18.0</b>	16.7	16.5
<i>Esophagus</i>	<b>8.0</b>	8.6	<b>10.0</b>	8.5
<i>Stomach</i>	<b>8.7</b>	<b>8.1</b>	<b>10.0</b>	9.5
<i>Colon and Rectum</i>	<b>55.0</b>	<b>55.5</b>	<b>58.0</b>	52.4
<i>Liver and Intrahepatic Bile Duct</i>	<b>9.2</b>	<b>8.0</b>	<b>8.2</b>	10.7
<i>Pancreas</i>	13.7	<b>12.8</b>	<b>14.2</b>	13.7
<i>Larynx</i>	<b>8.5</b>	<b>8.8</b>	<b>7.4</b>	6.6
<i>Lung and Bronchus</i>	<b>101.9</b>	<b>110.4</b>	<b>89.41</b>	79.5
<i>Melanoma of the Skin (whites)</i>	<b>31.8</b>	<b>28.9</b>	<b>21.3</b>	27.4
<i>Prostate</i>	<b>150.6</b>	<b>130.2</b>	<b>142.6</b>	147
<i>Testis</i>	<b>4.5</b>	5.3	<b>6.7</b>	5.5
<i>Urinary Bladder</i>	<b>34.5</b>	<b>37.7</b>	<b>45.4</b>	37.0
<i>Kidney and Renal Pelvis</i>	21.2	<b>21.8</b>	20.8	21.1
<i>Brain and Other Nervous System</i>	8.0	<b>8.3</b>	<b>8.4</b>	7.9
<i>Thyroid</i>	<b>5.0</b>	5.9	<b>7.7</b>	6.0
<i>Hodgkin Lymphoma</i>	3.0	<b>2.9</b>	<b>3.6</b>	3.2
<i>Non-Hodgkin Lymphoma</i>	<b>21.5</b>	23.1	<b>24.6</b>	23.4
<i>Myeloma</i>	7.6	7.2	<b>7.1</b>	7.5
<i>Leukemia</i>	<b>16.0</b>	16.9	<b>17.6</b>	16.7

# Results

## Males, States

### □ **Appalachia counties vs. non-Appalachia counties**

- *All sites combined*
  - *Lower in AL, GA, NC, PA, VA*
  - *Higher in MS, NY, OH, SC, TN*
  - *WV higher than US non-Appalachia*
- *No consistent site-specific pattern*
  - *Prostate cancer lower or comparable, except one state*
  - *Lung cancer higher in 10 states*

### □ **Appalachia states vs. US non-Appalachia**

- *All sites higher in all but MD and VA*
- *Lung cancer higher in all states*

# Invasive Cancer Incidence Rates by Primary Site and Appalachian Region and US, Females, All Races, 2004-2011

	Southern Rate	Central Rate	Northern Rate	US Non-Appalachia Rate
All Sites	402.3	427.2	449.3	418.2
Oral Cavity and Pharynx	6.6	6.4	6.3	6.2
Esophagus	1.6	1.6	1.9	1.9
Stomach	4.4	3.9	4.2	4.7
Colon and Rectum	39.1	41.0	43.8	39.5
Liver and Intrahepatic Bile Duct	2.9	2.7	2.6	3.6
Pancreas	10.2	9.5	11.0	10.7
Larynx	1.9	2.3	1.7	1.4
Lung and Bronchus	56.5	67.0	58.2	54.7
Melanoma of the Skin (whites)	22.6	19.8	15.9	17.8
Breast	117.3	115.0	121.5	122.4
Cervix Uteri	8.2	8.8	7.9	7.9
Corpus and Uterus, NOS	18.8	24.5	31.1	24.5
Ovary	12.4	12.4	13.4	12.3
Urinary Bladder	7.8	9.4	11.3	9.3
Kidney and Renal Pelvis	11.1	11.9	11.8	11.0
Brain and Other Nervous System	5.9	6.1	6.1	5.7
Thyroid	14.6	17.4	25.5	17.7
Hodgkin Lymphoma	2.2	2.3	2.9	2.5
Non-Hodgkin Lymphoma	14.9	16.2	17.7	16.3
Myeloma	4.9	4.5	4.6	4.9
Leukemia	9.8	10.3	10.9	10.2
Breast, in situ	28.2	23.4	29.7	30.5

# Results

## Females, States

### ❑ **Appalachia counties vs. non-Appalachia counties**

- *All sites combined*
  - *Lower in VA*
  - *Higher in GA, KY, MD, NY, SC, TN*
- *No consistent site-specific pattern*
  - *Lung cancer higher in 7 states*
  - *Cervical cancer higher in 4 states, lower in 1 state*
  - *Thyroid cancer higher in 6 states*

### ❑ **Appalachia states vs. US non-Appalachia**

- *All sites higher in 7 states*
- *Lung cancer higher in 10 states*
- *Cervical cancer higher in 5 states, lower in 1 state*

# Invasive Cancer Incidence Rates by Appalachian Region and US, By Race, 2004-2011

- ❑ **No consistent pattern by race vs. US non-Appalachia**
  - *White higher in Central and Northern regions*
  - *Black higher in Northern region only*
- ❑ **Black:White within each region**
  - *Black higher in Southern and Northern regions*

	Southern	Central	Northern	US Non-Appalachia
	Rate	Rate	Rate	Rate
White	470.4	<b>482.0</b>	<b>493.5</b>	470.4
Black	<b>483.3</b>	476.9	<b>513.5</b>	480.0
% Black Population	14%	4%	4%	11%

# Invasive Cancer Incidence Rates, By Race, West Virginia, 2004-2011

- ❑ **No evaluation by race and county**
- ❑ **Black:White within state**
  - *All sites lower*
  - *Colorectal comparable*
  - *Lung and bronchus*
    - *Lower males/females combined and females*
    - *Comparable males*
  - *Stomach and liver/intrahepatic bile duct higher*
  - *Females, breast and cervix comparable*
  - *Males, prostate higher*

# Invasive Cancer Incidence Rates by Appalachian Region and US, By Economic Status, 2004-2011

## □ Southern

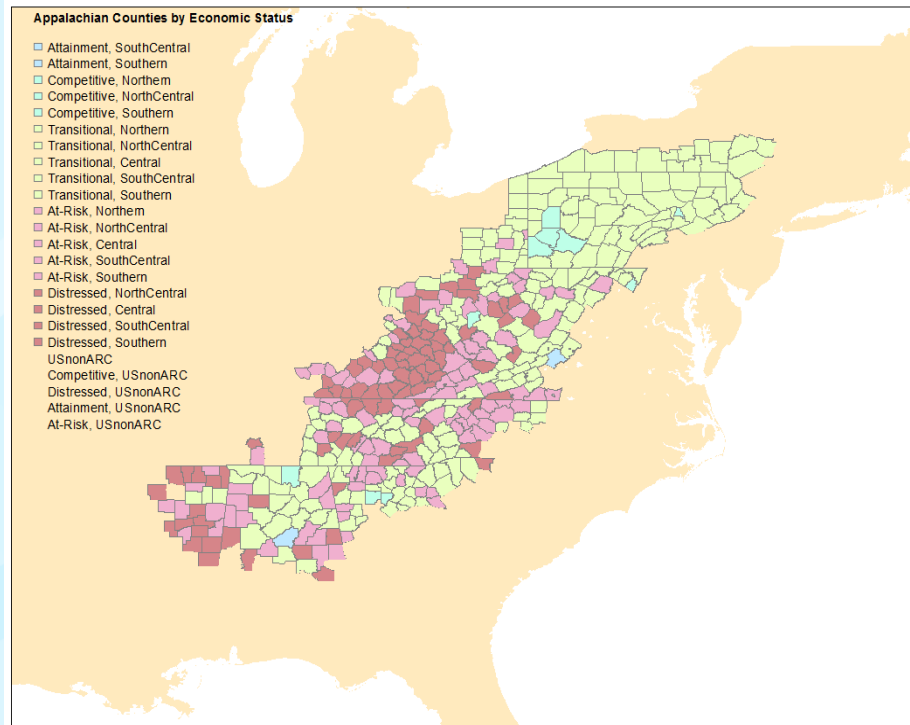
- *Transitional and Distressed status counties higher rate*

## □ Central

- *Distressed status counties higher rate*

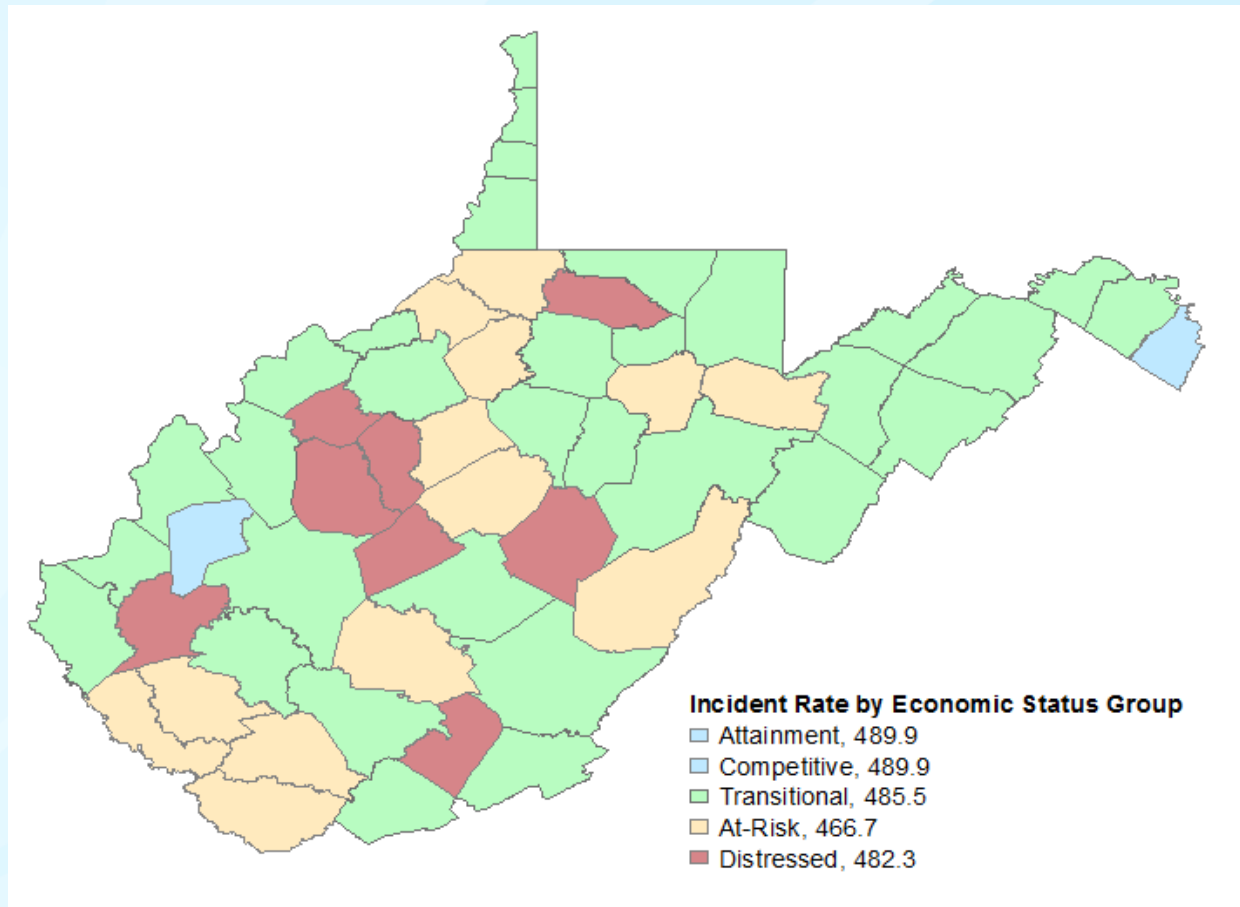
## □ Northern

- *Transitional status counties lower rate*



	Southern Rate	Central Rate	Northern Rate
Competitive/Attainment	454.1	481.7	505.9
Distressed	<b>467.9</b>	<b>503.2</b>	~
At Risk	452.9	475.8	497.8
Transitional	<b>478.8</b>	480.4	<b>493.1</b>

# All Sites, All Races, Male and Female, by West Virginia County and Economic Status, 2004-2011





# Conclusions

- ❑ **Overall Appalachia rate higher**
  - 2001-2003 IR 568.7 vs. 539.4
  - 2004-2011 IR 484.9 vs. 469.6
- ❑ **No consistent patterns**
  - *Except larynx and lung consistently higher*
  - *Except white population*
- ❑ **Further analysis by race/sex/site**
- ❑ **Further analysis by race/sex/site/economic status**

# Reda J. Wilson, MPH, RHIT, CTR

**[dfo8@cdc.gov](mailto:dfo8@cdc.gov)**

**770-488-3245**

**<http://www.cdc.gov/cancer/npcr/index.htm>**

*The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the  
Centers for Disease Control and Prevention.*